

CHAPTER 9

Protecting Water Quality

Water is the most precious natural resource on the planet. It is the source of all life, and clean water is essential to a sustainable planet. Yet across the planet, we see the harmful consequences of human activity on water quality. From contamination of freshwater reserves to pollution of the oceans, water quality stands as a critical environmental issue.

Water pollution worldwide varies dramatically by region and by body of water. For example, in developing countries, access to clean, potable water is a critical issue. The United Nations estimates that 1.1 billion people live in regions without access to an improved water supply, and an additional 2.4 billion people do not have access to any type of improved sanitation facility (United Nations, 2008). As a result, fecal pollution of surface water is an important international issue, and about 2 million people die each year from waterborne diseases.

In addition to the direct consequences of freshwater pollution, pollution of the world's oceans and coastal areas is producing serious environmental problems. The large majority of marine pollution worldwide originates from land-based activities, with chemicals, litter, and waste washing into streams and rivers, and ultimately reaching coastal waterways. The by-products from human activities upstream drain into lower regions through water runoff, and as a result, pollution ultimately reaches estuaries, wetlands, bays, and oceans. Every region of land contributes to one or more watersheds, and human behavior in these watersheds is the primary cause of water contamination worldwide.

The Problem

While every area faces its own unique set of water quality issues, here we highlight several general types of water pollution (U.S. Environmental Protection Agency [EPA], 2009).

- *Dissolved Oxygen.* Dissolved oxygen is necessary for most aquatic organisms—especially fish and invertebrates. Plant matter such as leaves and grass, along with food and other organic waste, reduce the amount of oxygen in the water, ultimately harming fish and other biological organisms.
- *Pathogens.* Bacteria and other microorganisms (e.g., salmonella, viruses, giardia) can cause illness and death when consumed or contacted by other organisms. While such pathogens are more typical in areas with inadequate sewage treatment, they are also found in water contaminated by leaky sewage systems and in areas with high concentrations of livestock.
- *Chemical Pollutants (Organic).* There are a number of organic chemicals that are frequently discharged into waterways, including detergents, food wastes such as grease and fats, petroleum and oil, and hygiene and cosmetic products.
- *Chemical Pollutants (Inorganic).* Nonorganic discharge comes primarily from silt and sediment dislodged during construction or logging activities, but it also includes nitrates and phosphates from fertilizers; metals such as mercury, lead, copper, and arsenic; and chemical waste from industrial processes (e.g., dioxins, polychlorinated biphenyls [PCBs]).

Sources of water pollution can be classified as either a point source or a non-point source. Point sources include discrete, identifiable sites, such as a factory, sewage treatment plant, or a city storm drain. Nonpoint sources include cumulative effects from many small contributors, such as nitrogen from fertilizers used in agricultural regions or runoff from city streets and neighborhoods. While historically water pollution has originated from point sources, today it is widely recognized that nonpoint source pollution is the leading cause of water contamination (U.S. EPA, 2010). In essence, it is the aggregated effects of human activity and not the single indiscretion of a company or business that causes most pollution. As a result, social marketing provides an important tool for protecting and improving water quality.

Potential Behavior Solutions

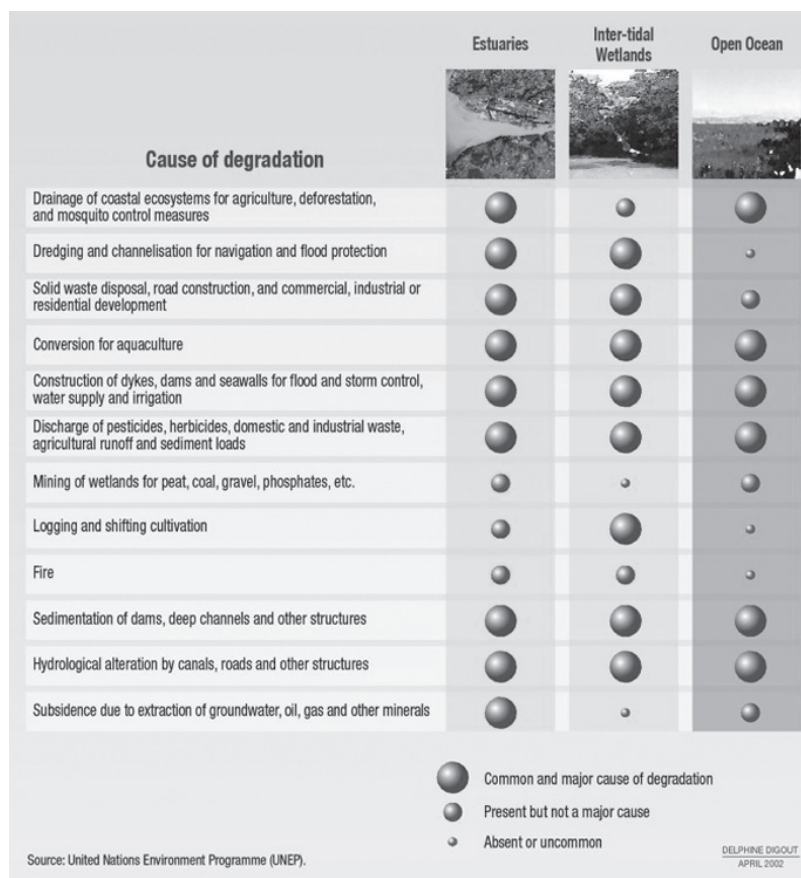
Water pollution worldwide is caused by human behavior. While industrial processes have historically been the major culprit for water pollution, today it is the cumulative impact of nonpoint sources. In many instances, the contaminants found in the water can be traced back to a specific behavior or to use of a specific product. For example, construction activities often result in dirt and sediment draining into local waterways, clearing ice and snow from roadways in the winter can result in salt discharges, and restaurants hosing down mats and equipment can discharge grease and fats.

Because each area faces its own unique water pollution issues, it is important to follow the contaminant upstream to its source. From a social marketing perspective, this is a central first step in developing a campaign. Water monitoring and testing will show the levels of specific contaminants, and each of these can be compared to a local or regional limit—that is, the Total Maximum Daily Load (TMDL). For an example and discussion of TMDLs, see the U.S. EPA's website at www.epa.gov/owow/tmdl.

At a global level, the United Nations has summarized the primary causes of oceanic water pollution worldwide. These are shown in Figure 9.1 and reflect the myriad of human activities that result in discharge. The figure shows the impact of various types of human behavior on estuaries—intertidal and wetlands—and the open ocean. Of course, each of these categories of activity needs to be reduced to more specific end-state behaviors, but it's helpful to consider the types of behaviors that are having the largest impact. Of particular note is the role of commercial entities as a primary cause of water degradation—from construction, agriculture, logging, and mining, commercial entities play a central role in water quality.

This chapter focuses on commercial entities and social marketing activities that involve businesses. Such activities can take a number of forms. Our focus in this chapter is on social marketing activities with commercial entities as the target audience—that

Figure 9.1 Causes of Water Pollution Worldwide



Source: United Nations Environmental Programme, <http://www.unep.org/dewa/vitalwater/jpg/0321-human-actions-EN.jpg>. Reprinted with permission.

is, social marketing programs that attempt to promote changes in business practices. However, it is important to point out that social marketing activities can also target employees and aim to change the behavior of individuals in their workplace—for example, encouraging workers on charter fishing boats to use the onboard storage tank for human waste rather than dumping it into the ocean. And finally, social marketing activities can occur through commercial channels but target customers. For example, a social marketing program aimed at reducing pesticide runoff might work with local businesses to establish an exchange program to collect products with specific chemicals. As an example, the pesticide Diazinon was recently banned in the United States, and many communities are now developing programs to collect unused product.

We turn now to examples of social marketing programs aimed at inducing change in the commercial sector.

CASE #1 Chuyen Que Minh (My Homeland Story): Reducing Insecticide Use Among Rice Farmers (Vietnam)

Most water consumption worldwide is attributed to agriculture. About 75% of all water consumed is used to irrigate crops, while industrial uses account for about 20%, and only 5% is used for domestic purposes. Agricultural activities are tied to water quality in a number of important ways, including the use of pesticides, fertilizers, and sediment runoff resulting from clearing land and irrigating crops. Our first example is a social marketing campaign aimed at rural rice farmers in Vietnam.

Background

In Asia, rice is a primary food staple. Approximately 90% of the world's rice is produced in Asia, and for individuals living in countries like Vietnam, rice accounts for 50% to 80% of daily caloric intake (Huelgas, Templeton, & Castanar, 2008). Rice farms in Vietnam are largely family-run businesses, with small individual farms producing a substantial portion of rice. In an effort to increase productivity, many farmers began using insecticide sprays during the 1980s. This rise was driven by economic pressures to increase productivity, coupled with advertising campaigns by the pesticide industry and bank loans that promoted the purchase of spraying equipment (Conway & Pretty, 1991).

By the late 1990s, insecticide use was widespread on rice farms throughout Asia. A survey in 2000 found that 97% of farmers interviewed used at least one type of pesticide, and the average farmer sprayed multiple times during a growing season. However, as much as 80% of the insecticide sprays used were unnecessary. In fact, studies of farmers' use of insecticides showed that more than 75% of the active ingredients failed to reach the plant targets and instead ended up in the water and soil. While agricultural studies showed that leaf-feeding insects had little impact on rice yields, farmers generally perceived leaf-feeding insects as the most important pest (Escalada, Heong, Huan, & Chien, 2009).

While the proper use of pesticides can help to increase crop yield, the effects are generally short-lived, and they can have serious harmful consequences. First, the chemicals result in human health problems, including asthma, eye irritation, and pulmonary disorders. Second, the chemicals contaminate the soil and in the long term can reduce crop yield. And third, the chemicals have harmful effects on other plants and animals in the region (cf. Heong & Escalada, 1997). For example, in rice farms that are pesticide free, it is possible to farm certain types of shrimp along with rice. However, cofarming of shrimp or other types of fish cannot happen in areas with pesticide use because of the resulting water contamination.

Target Audience(s) and Desired Behaviors

The target audience for the campaign was Vietnamese rice farmers living in Vinh Long province, an area south of Ho Chi Minh City. The province has a total population of more than 1 million, of which 883,000 live in a rural setting. The main economic activity in the region is agriculture, and the area produces nearly 1 million tons of rice per year.

The target behavior was the indiscriminant spraying of insecticides. Rather than attempting to eliminate insecticide use, the campaign aimed to promote a more efficient use of insecticides and to encourage Integrated Pest Management. The targeted behavior was to avoid spraying during the first 40 days after planting, during which time insecticide use has little benefits. In addition to the 40-day period, the campaign promoted more efficient use of fertilizers and seeds and nonchemical solutions to pest management.

Barriers and Benefits

Survey data from Vietnamese farmers had been conducted for more than 15 years prior to the program. The existing data showed the widespread use of insecticides, and the general belief among farmers that leaf damage would reduce crop yield. There was also a finding that some farmers viewed insecticides as “medicinal” and believed that they would generally result in healthier farmland.

Description of the Program

The campaign consisted of a radio soap opera, *Chuyen Que Minh* (translated as *My Homeland Story*). The radio show was broadcast on several major Vietnamese stations twice per week for 1 year. Each of the 20-minute episodes told the story of a farming family, as family members faced their daily challenges. Embedded throughout the stories were the principles of Integrated Pest Management and the desirable farming behaviors. The characters in the story were based on a real-life farming family, identified through demographic analyses to represent the typical family in the region. In developing the scripts, the production team visited the family regularly to learn about the activities, behaviors, and common expressions that could be integrated into the episodes.

The materials were developed through a series of workshops with members of the farming community, including input on the radio scripts, posters, and

leaflets (pilot). In addition, all materials were pilot tested through regional "radio clubs" before being finalized and distributed. (See Figure 9.2.)

A total of 104 episodes were broadcast over a 1-year period, from 2004 to 2005 (implementation).

Evaluation

Survey data was used to assess the impact of the program on Vietnamese farmers. An initial survey was conducted with 605 farmers in the target region to

Figure 9.2 Chuyen Que Minh: A Vietnamese Radio Soap Opera to Reduce Pesticide Use Among Rice Farmers



Source: Photograph provided courtesy of Kong Luen Heong, International Rice Research Institute.

identify beliefs and practices and to inform the campaign materials and development. Then, prior to the launch of the program, a pretest survey was conducted with 600 farmers. And finally, at the conclusion of the program, another survey with 609 farmers was conducted.

During the 1-year period, 41% of farmers reported listening to the soap opera. In comparing the pretest and posttest surveys, a number of significant effects were noted. First, the percentage of farmers who believed that spraying insecticide was necessary during the first 40 days of planting dropped from 80% to 48%, and the percentage of farmers who believed that leaf damage would mean reduction in crop yield dropped from 59% to 38%. In addition, farmers were more likely to believe that spraying insecticides on their farmland could negatively affect their health (from 62% at pretest to 86% posttest).

With regard to behavior, the program reported a significant reduction in insecticide spray rates. During the pretest, the average farmer reported spraying 1.9 times per season, and at posttest, the average farmer reported spraying 1.3 times—a reduction of 31%. The effect was particularly strong for farmers who reported listening to the soap opera, among whom the posttest surveys showed a 60% reduction in the number of sprays. In addition, farmers who reported listening to the soap opera were substantially more likely not to use any insecticide (54%) compared to farmers who did not listen (15%). See Heong and colleagues (2008) for additional details.

Critical Review

The Chuyen Que Minh radio soap opera provides a creative example of a social marketing program designed to promote changes in a diffuse commercial context. The authors refer to the approach as “entertainment-education” but it is really much more than simple education. Through the radio stories, the episodes convey a social norm for the proper behavior. That is, the episodes provide role models for adopting the targeted behavior and convey a message that such actions are common and accepted. Bandura (2002) has argued that such “serial dramas” serve to empower viewers and to install a sense of self-efficacy. See Dagron (2001) for other examples of serial dramas.

The results from the Chuyen Que Minh campaign show clear effects. Particularly noteworthy is the program’s focus on community involvement and the efforts throughout the campaign to involve members of the Vietnamese farming community in developing and pilot testing the materials. Another program strength was the focus on a single behavior: avoiding insecticide use during the first 40 days after planting. And the survey data collected before, during, and after the program provide a good method for evaluating the overall impact.

The Chuyen Que Minh campaign provides a clear example of “what works.” However, there are several elements that could have strengthened the program. First, the evaluation relied exclusively on survey data, and while the pattern of results is clear, behavioral observations would have strengthened the findings. Examples of behavioral data might have included water testing at randomly

selected farms throughout the region, observations, and sampling of seedlings during the first 40 days of planting, or pesticide sales receipts from local vendors and retail locations.

Second, the program relied heavily on passive radio messages. As described elsewhere in this book, mass media messages are particularly effective for increasing awareness or promoting favorable attitudes, but they often struggle to induce lasting behavior change. To strengthen the message, the campaign could have added program elements to directly reach farmers—for example, recommendations by retail staff at the point of purchase for pesticides, community workshops designed to promote and reinforce positive pest management behaviors, or personal contact with farmers through an agricultural extension network.

Third, the evaluation would have benefited from a control group. That is, comparable survey or behavioral data obtained from farmers in similar regions of the country where the soap opera was not aired. The results previously reported were based on pre-post comparisons, and while the results show clear effects, it is unclear what would have happened without the program. Perhaps regional trends were already moving toward less pesticide use or there was a dramatic increase in the cost of insecticides. These external events could have been responsible for the reported results, and while they may seem unlikely, using a control group can help to eliminate these alternative explanations and to isolate the causal impact of the campaign.

The success of the program led to the development of related programs in Vietnam and other areas of Asia. One example is Que Minh Xanh Mai (translated as Forever Green My Homeland), which was launched in 2006 to educate rice farmers about environmental issues and conservation and to reduce harmful farming practices. For another example, see the 3R3G program described at the end of this chapter.

CASE #2 Dirty Dairying (New Zealand)

Background

Our second example of social marketing to protect water quality comes from New Zealand. Water quality in New Zealand is generally good, and the country boasts thriving tourism and recreational industries. However, despite an overall record for clean water, contamination of nitrogen and phosphorus levels have increased steadily since 1990 (New Zealand Ministry for the Environment, 2007). Water contamination from point sources has been notably improved, but pollution from nonpoint sources has increased.

One identified source of water pollution in New Zealand is dairy farming. While livestock have been a central economic activity in New Zealand for the past 100 years, recent trends have shown an increase in cattle and dairy farms. This increase in the number of cattle in New Zealand has been directly linked to deteriorations in water quality, particularly from animal effluent in rainwater runoff, rivers, and

catchments (Hamill & McBride, 2003). Current practice in New Zealand dairies allows cows to graze freely in open land. However, this practice means that the cows regularly cross streams and that dung and urine are washed into catchments and waterways. In addition to animal waste, economic pressures toward increased productivity of dairy farms has resulted in increased use of fertilizers on grazing land, which also contributes to the phosphorous and nitrogen.

While a number of structural and policy solutions have been proposed, there remains an important role for social marketing and encouraging dairy farmers to adopt practices that limit water contamination. One specific behavioral practice is for farmers to fence off streams in order to keep cattle from defecating directly in the water (Environment Waikato, 2004). Fencing also serves to protect other aquatic habitat and prevent bank erosion. However, dairy farmers have been slow to implement fencing solutions (Bewsell, Monaghan, & Kaine, 2007).

In an effort to raise awareness among the New Zealand public about the role of dairy farms in water contamination, Fish and Game New Zealand launched a campaign in early 2000.

Target Audience(s) and Desired Behaviors

There were several target audiences for the Dirty Dairying campaign. First (and foremost) were dairy farmers themselves, and the ultimate goal of the campaign was to promote changes in dairy farming practices that contribute to water contamination. However, secondary audiences were New Zealand residents, and by raising awareness about the issue, the campaign hoped to apply pressure to local politicians and decision makers.

The primary behavioral target was fencing and encouraging dairy farmers to fence off streams and waterways in the grazing areas. A related behavior was the installation of bridges at central water cross points to keep the cattle out of the water.

Barriers and Benefits

While no barriers and benefits data were collected prior to the launch of the campaign, the increased interest in the topic led to several subsequent studies of dairy farmers. Bewsell and colleagues (2007) report the results from interviews with 30 dairy farmers in four catchment regions in New Zealand. The interviews focused on the farmers' decision to engage in best practices and the perceived benefits of these behaviors. Target behaviors included fencing streams, managing effluent by installing a pond system, reducing fertilizer use, installing bridged water crossing points, and performing several other specific behaviors. Our focus here is on the results for fencing. The qualitative results were used to segment farmers into different groups.

The results suggest that farmers were more likely to engage in fencing activities when there was a perceived benefit to the farm or to comply with local laws and regulations (not necessarily out of environmental concern). The interviews showed that farmers' decisions were based largely on contextual factors of the farm, including plans for expanding or redesigning the farm

operations, streams that serve as boundaries to the farm, needs for fencing to manage stock movement (to improve dairy operations), and the existence of wetlands or boggy areas (where cattle can get stuck). Note that each of these contextual factors is linked to the efficiency or convenience of operating the dairy and not necessarily to broader considerations of downstream pollution. The authors concluded that, "adoption may be slow in the absence of on-farm benefits" and that "promotion of stream fencing needs to be strongly linked to on-farm benefits" (Bewsell et al., 2007, p. 201). In the absence of these direct farm benefits, regulation was seen as a central reason for compliance and the threat of fines or reduced sales.

Description of the Program

The Dirty Dairying campaign consisted of a series of media messages distributed to areas throughout New Zealand. The campaign materials highlighted the role of dairy farming in polluting lakes, rivers, and streams and the negative consequences for the people of New Zealand. The messaging platform was one of shame and general disapproval for current dairy practices.

Evaluation

While few details are available on public perception or recognition of the issue, the campaign is widely recognized as the impetus for the New Zealand Dairying and Clean Streams Accord in 2003. This was a voluntary agreement between Fonterra (a large farming cooperative group with more than 10,000 New Zealand farmers as members), the New Zealand Ministry for the Environment, the Ministry for Agriculture and Forestry, and regional councils. The accord aimed to promote changes in dairying practices, and to reduce water pollution. The accord also set specific targets, such as preventing cattle from entering streams (50% of all cattle by 2007 and 90% by 2012) and building bridged crossing points for cattle on dairies (50% by 2007 and 90% by 2012). In an effort to achieve these targets, a monitoring and enforcement plan was adopted that allowed for fines on farms not in compliance.

A 2008 report noted an 83% compliance rate for excluding cattle from waterways and a 93% compliance rate for bridging waterway crossings (New Zealand Ministry for the Environment, 2008).

Critical Review

The Dirty Dairying campaign illustrates the power of social marketing. However, unlike many of the examples discussed in this book, the campaign was successful because it influenced public policy and key decision makers (most notably, Fonterra). The campaign's use of shame to raise awareness and leverage social pressure on dairy farmers prompted a quick response by policy makers and industry leaders.

The policies voluntarily adopted by Fonterra resulted in a monitoring and enforcement program. Rather than encouraging or incentivizing farmers to

adopt the desirable farming practices, the policies imposed sanctions and fines for noncompliance. While this approach has been effective in New Zealand, it is important to consider several aspects of fines and sanctions that impact their efficacy as a behavior change tool. In general, inspection and enforcement programs are most effective when they are the following:

1. *Visible.* Enforcement programs need to be clearly communicated to the target audience, with visible indicators of their presence. Examples can include posted signage or print messages in local trade magazines or at retail locations. In addition, a few highly visible busts can go a long way toward maintaining the salience of the program.
2. *Enforceable.* The targeted behaviors need to be clearly defined, the penalties need to be explicit and strong, and there needs to be a mechanism for enforcement. In addition, the entity responsible for imposing the sanctions needs to be legitimate and ideally associated with a governmental organization.
3. *Equitable.* The monitoring and enforcement needs to be applied fairly across the target audience, with systematic inspections and uniform penalties.
4. *Sustainable.* Once imposed, the policies and fines need to remain in effect for a long period of time. Because the motivation to engage in the behavior is external to the individual (i.e., individuals are doing the behavior in order to avoid the penalty), compliance will only persist as long as the threat of punishment is in place. If the program stops, or its salience and enforcement decline substantially, individuals are likely to “take their chances” and compliance rates will drop.

With these considerations in mind, monitoring and enforcement can play a role in social marketing activities. As illustrated by the Dirty Dairying campaign, fines and sanctions can quickly change the behavior of a target audience. However, such programs also come with some severe limitations. These include program costs associated with the staffing and infrastructure required to monitor and process the cases. Enforcement programs are also generally disliked by members of the target audience, and there is likely to be some political resistance on the part of the individuals to comply. And third, the changes induced by such programs will be specific to those behaviors that are enforced, and typically, individuals will do the least amount necessary to comply. It is rarely the case that monitoring and enforcement programs will spill over into related behaviors. For instance, in the case of the New Zealand dairy farmers, if the program is specific to stock management practices such as fencing, it's highly unlikely that a farmer will also voluntarily work to reduce fertilizer use in order to bring down nitrogen rates in the water (unless, of course, the discharge is monitored and enforced rather than the specific behaviors).

Other Notable Programs

The cases presented in this chapter provide good examples of social marketing programs used to reach commercial entities and protect water quality. But there are certainly many other excellent examples, and in the next short section, we briefly mention a few notable programs.

3R3G: Three Reductions, Three Gains

Building on the success of social marketing programs targeting rural farmers in Asia, the 3R3G campaign was designed to promote three behaviors: reduce seed use, reduce the use of nitrogen fertilizer, and reduce the use of pesticides (the “three reductions”). The benefits associated with these changes in farming practices were to reduce production costs, improve the health of rice farmers, and protect the environment (the “three gains”). The campaign targeted farmers in the Mekong Delta region of Vietnam, an area consisting of 13 provinces and accounting for 52% of national rice output (about 36 million tons per year). The 3R3G campaign utilized the Chuyen Que Minh soap opera, coupled with a number of on-the-ground outreach activities with farmers. These included expanded media placements (i.e., billboards, TV, print, pamphlets) and community events including demonstrations and “farmer field days.” As a result of the media and community events, the authors noted that, “it became nearly impossible for a farmer not to hear about 3R3G” (Huelgas et al., 2008).

Data evaluating the program came from a series of surveys conducted with random samples of farmers from each province. The surveys were supplemented with focus groups, price data from retail shops in the provinces, and through interviews with local government officials, extension workers, and seed growers. Results showed that after the yearlong campaign, 80% of farmers were aware of the program’s message. The authors attribute this to the widespread media placement, but also note that “. . . it takes more than awareness to affect practices.” In this regard, the community events and community-based activities of the extension workers helped to promote behavior changes. “The media campaign . . . made it easier for the technicians to motivate farmers in taking small risks by reducing inputs gradually from one season to the next. This eventually led to adoption” (Huelgas et al., 2008).

Think Blue San Diego

Like many coastal areas around the world, the City of San Diego faces pollution from storm water runoff. Runoff from rain, along with irrigation and other water-use activities (e.g., washing cars, hosing off walkways), collects contaminants from the urban region and deposits them in the bays, estuaries, and along beaches. Many of these contaminants are the direct result of specific behaviors by residents and businesses in the surrounding community, so reducing pollution will require changing behavior. Preventing storm water pollution generally occurs by managing specific pollutants like pet waste, fertilizers, and automotive fluids, but it also involves preventing water runoff. Examples of reducing runoff include properly adjusted landscape irrigation, using brooms to sweep off walkways rather than hosing them down,

or planting groundcover to prevent erosion and water runoff. To help foster these changes, the City of San Diego developed its Think Blue campaign. Think Blue was launched in 2001 to “educate residents, business and industry leaders about the effects of storm water pollution and about ways to prevent that pollution from harming our environment” (Think Blue, n.d.).

Think Blue has adopted community-based social marketing (CBSM) as a guiding framework for developing, implementing, and evaluating its programs. Each program activity targets one or more specific contaminants and emphasizes positive behavior change among a specific target audience. Thus, while the Think Blue brand provides an umbrella message, the program also conducts specific outreach activities in response to regulatory requirements (e.g., TMDLs) and behavioral priority areas. One such program was a business outreach program conducted in La Jolla Shores (Tabanico & Nichols Kearns, 2009).

In conducting its regular water quality monitoring studies, the city identified bacteria levels in the La Jolla Shores Cove as a priority. The La Jolla Shores region has been designated by the California State Water Resources Control Board as an Area of Special Biological Significance (ASBS), and it serves as a regional hub for tourism and recreation. Bacterial contamination leads to beach closures, affects water quality, and ultimately has harmful consequences for the marine life in the cove. The targeted program began with community observations, in an effort to identify sources of bacterial contamination. The observations revealed a number of potential target behaviors, including litter (trash and cigarette butts), pet waste, and standing water on the streets, gutters, and alleyways. Separate interventions were developed for each of these, including a pet waste program for residents and added trash and ash receptacles in the public areas. For businesses, the program specifically targeted water discharge. Observations suggested four business practices that were linked with water runoff, including

- hosing off beach equipment (surfboards, kayaks) by rental shops,
- hosing down storefronts and sitting areas by local merchants,
- overwatering of potted plants and landscaping in the areas outside the stores,
- overflowing Dumpsters, and
- hosing down mats and equipment by restaurants (particularly in the alleyways at closing time).

Following the observations, the team conducted interviews with local businesses in the La Jolla Shores area, with questions about various practices related to water runoff, and also barriers and benefits to several best management practices (BMPs). From these interviews, the team developed a series of training materials and conducted one-on-one sessions with business owners and employees. The trainings were conducted jointly by staff from the City of San Diego and a local coastal protection nongovernmental organization (NGO) (Coastkeeper). Each training session was tailored to the type of business, and they included a site inspection, educational materials and literature, customized BMPs, utilized vivid language focusing on positive behaviors (rather than listing what not to do), and concluded by providing the business with a Think Blue window decal to be placed in the entryway.

Evaluation data were collected using behavioral observations conducted in the La Jolla Shores business area and in a similar business area in San Diego that did not receive the CBSM business outreach program (Windansea). The social marketing program lasted 18 months, and the same observation protocol was used at pretest and posttest. Relative to the control community, several outcomes were identified that were unique to the La Jolla region:

- Observed water in the gutter decreased by 67% over the 1-year period. For the control region, water in the gutter also decreased slightly but not as much as for the treatment community.
- Water flowing from weepholes along the street decreased by 67%; for the control region, weephole drainage increased slightly during the same period.
- Debris in the gutter decreased by 77% in the La Jolla region; it increased slightly in the control region.
- Standing water attributed to washing beach equipment decreased by 85% in the La Jolla region.

In addition to these changes, several of the observed behaviors did not differ between the treatment and control areas. Overwatering of plants, puddles, and standing water in alleyways and amount of wet pavement did not change during the treatment period. In addition, no differences were noted between the treatment and control sites in the amount of litter or in the amount of pet waste.

Smart About Salt, Region of Waterloo, Canada

In cold weather regions around the world, salt and sand are used to remove snow and ice from roadways and walkways. Salt is cheap, and when mixed with other products like sand or calcium chloride, it provides an effective mechanism for melting ice and improving traction. But the widespread use of salt for deicing also has many negative side effects. First, salt is corrosive to metal and causes damage to vehicles and metal structures like bridges and posts. Salt also has environmental consequences: It contaminates drinking water, is harmful to freshwater fish and other biological organisms, and can attract animals to roadways increasing deaths and accidents (e.g., moose and deer often lick the salty surfaces).

In an effort to reduce the harmful effects of salt from deicing, the Waterloo Region in Canada developed a Smart About Salt program. The program was launched in 2008 to reduce salt application rates while maintaining pedestrian and motorist safety and targeted private snow contractors and facility owners who used salt on their parking lots and sidewalks. The program involved training, accreditation, and ongoing monitoring by businesses. The training focused on best management practices and implementation of specific strategies for the storage, management, and application of salt. In the first year following its launch, the Waterloo program accredited 12 contractors and registered an additional 40 for the program. In addition, the program received support from several trade associations and a commitment from an insurance company that specializes in the snow and ice

industry to provide a 5% discount to accredited contractors. As a result of the program's success in attracting contractors and business, it is currently being expanded to cover the entire province of Ontario (see www.smartaboutsalt.com).

Summary

In this chapter, we have examined social marketing programs that aim to change business practices and protect water quality. Nowhere is the effect of human activity more evident than in water quality. Water is fundamental to life on our planet, yet lakes, oceans, and aquatic areas worldwide are being polluted. While historically much of the water pollution came from single point sources, such as a factory or manufacturing facility, today nonpoint sources account for the majority of water pollution. And many of these nonpoint sources are small commercial entities, like stores, farms, or contractors.

The chapter presented two detailed cases illustrating the role of social marketing in changing business practices. In the first case, we examined the Chuyen Que Minh radio soap opera targeting Vietnamese rice farmers. The “entertainment-education” approach provided information about effective farming practices, but it was embedded within a larger serial drama about the daily challenges of a rural farming family. Over the 1-year program, farmers in the targeted region reported spraying insecticide on their crops 31% fewer times, and the effect was especially strong among farmers who reported listening to the show.

In the second case, we examined the Dirty Dairying campaign in New Zealand. One of the largest commercial activities in New Zealand is dairy farming, but herd management activities can have a direct impact on water pollution. The campaign led to the adoption of a regional accord requiring dairy farmers to adopt specific practices. By 2008, 83% of farmers had adopted fencing strategies to keep cattle out of the streams, and 93% had installed bridging for water crossings.

Questions for Discussion

1. Leanne is helping to develop the Smart About Salt program in Canada. The core element of the program involves training and certification for contractors who run small snow-removal businesses. From a social marketing perspective, what other elements could be added to attract contractors to the program? Be specific.
2. Tim is a program officer for the Think Blue program in San Diego. In an effort to address coastal bacteria pollution, Tim is developing a social marketing campaign to prevent litter from entering the storm drains in the Chollas Creek business area. He began by conducting observations in a retail location to identify the sources of litter. From these observations, Tim noted a high percentage of intentional littering behavior by shoppers in the retail areas. Nearly half of the individuals who disposed of items in these areas littered. The most frequently littered items were cigarette butts, food remnants, plastic wrappers from

purchased items, and food wrappers. Tim wants to conduct a social marketing campaign to reduce litter. Using the findings from his observations and your knowledge of social marketing, how would you proceed? What next steps would you recommend?

3. The Chuyen Que Minh radio soap opera described in this chapter reported a number of positive results and changes in the practices of rice farmers in Vietnam. Do you think that a radio soap opera would be an effective channel of communication for addressing water quality issues in your region? In thinking about this marketing approach, consider different target behaviors, their barriers and benefits, and various target audiences.
4. Liz works in the Newport Bay region. A recent water quality report showed a high level of dissolved copper in the marine water. The reading was 29 ppb, and the state standard allows for only 3.1 ppb. Studies have shown that much of this copper is coming from anti-algae paint applied to the bottom of boats (which contains copper sulfate) and the brushing of hulls that dislodges small paint chips. From a social marketing perspective, how would go about identifying the target audience for a campaign to address this problem? (For more background, see Johnson & Gonzalez, 2005.)

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